

THINK
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Learnings from the World's First Tall Wood Buildings

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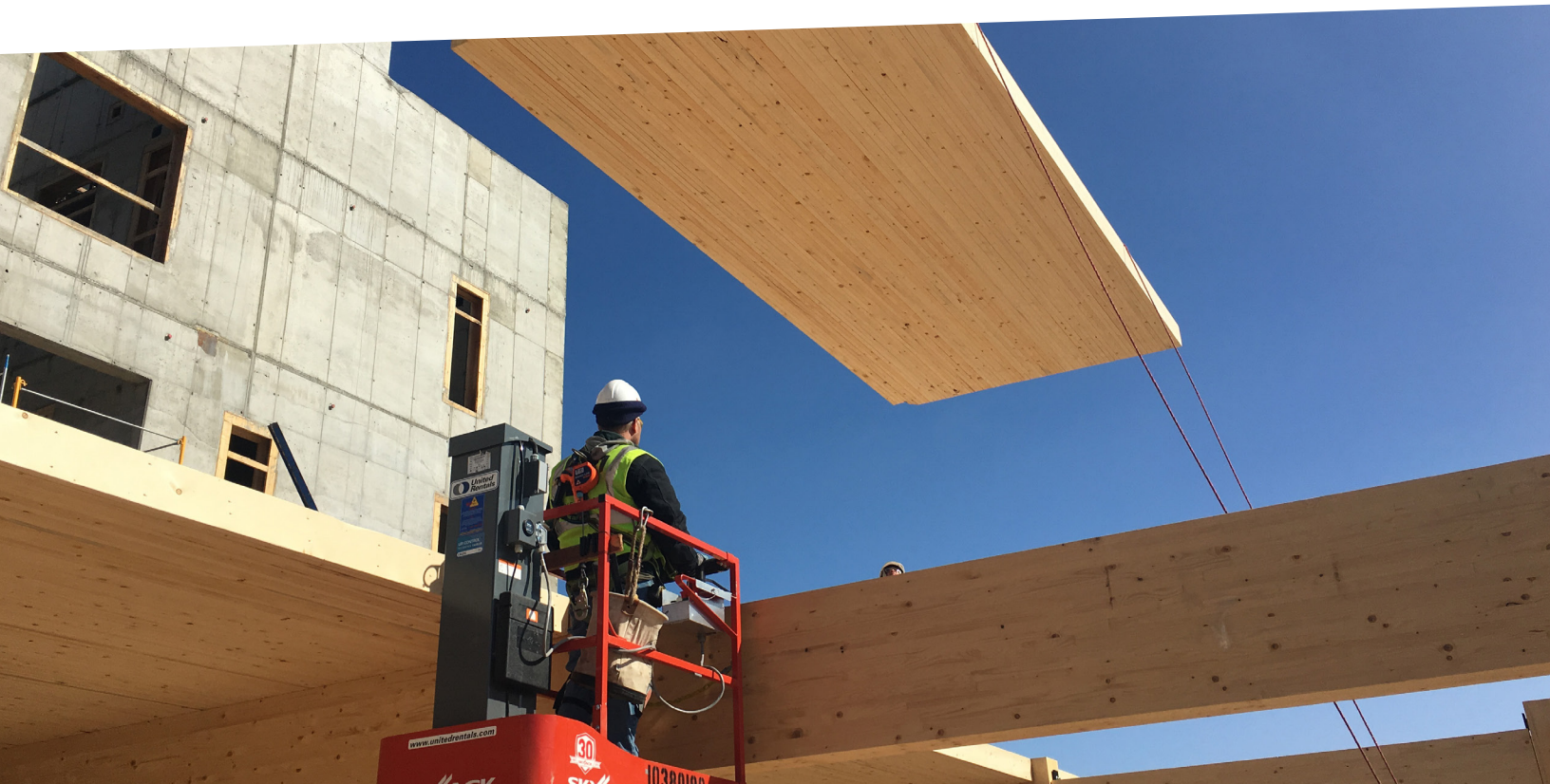
Introduction to the Survey of International Tall Wood Buildings

Taller wood building construction is on the rise – both in quantity and actual height. As the International Building Code (IBC) adopts changes set in motion during late 2018 for mass timber, the world will see more mass timber construction in both residential and non-residential capacities.

It is essential to learn from early adopters of mass timber construction, so that the practice can be embraced on a global scale. In 2014, Forestry Innovation Investment (FII) and the Binational Softwood Lumber Council (BSLC) commissioned a survey of ten tall wood building projects in several countries, with a goal of understanding the experiences of four key stakeholder groups involved in mass timber construction projects.

- Developer/Owners
- Design Teams
- Authorities Having Jurisdiction (AHJ)
- Construction Teams

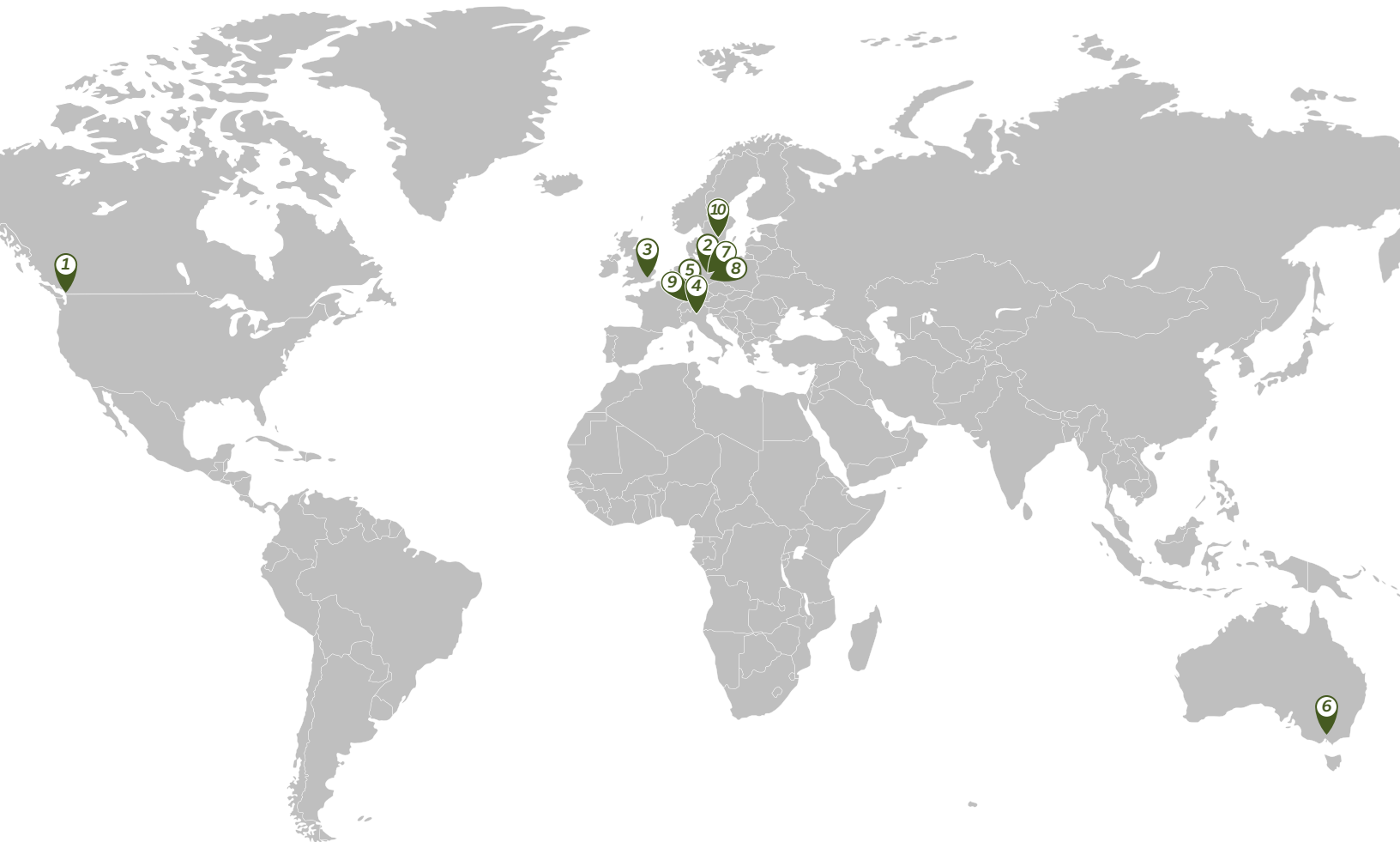
Results of the survey point to several common lessons learned across all projects and shed light on specific considerations for success during the entire duration of a project.



Chapter 2

Projects Surveyed

1. *UBC Earth Sciences Building*
Vancouver, Canada
2. *3XGRÜN*
Berlin, Germany
3. *Bridport House*
London, England
4. *Cenni di Cambiamento*
Milan, Italy
5. *LifeCycle Tower ONE*
Dornbirn, Austria
6. *Forté*
Melbourne, Australia
7. *E3*
Berlin, Germany
8. *Holz8*
Bad Aibling, Germany
9. *Tamedia*
Zurich, Switzerland
10. *Limnologen*
Vaxjo, Sweden



Why Mass Timber – *Top Three Reasons Builders Choose Timber*

There are a lot of reasons why mass timber projects are gaining in popularity so quickly. By early 2019, there were over 500 mass timber projects completed or in progress in the United States alone.

Building with mass timber can be economical, sustainable, and fast to construct. It's aesthetically pleasing and can be good for human and environmental health. The list of benefits goes on, but teams that have completed work on successful mass timber projects around the world agreed on three key motivators for pursuing a tall wood project.



Butler Square | Photography: Preservation Alliance of Minnesota



Alliance Center | Gensler | Photography: David Lauer



38 Davis | Ankrom Moisan | Photography: CBPHOTO

1. Innovation

Mass timber is on the cutting edge of innovation in the construction industry, and early adopters are seeing the benefits of innovation in design and construction. Offsite prefabrication cuts construction timelines dramatically, and the unique properties of mass timber products are creating opportunities to rethink traditional design of both commercial and residential properties.

2. Market Leadership

Forward-thinking owners, developers, and builders alike want to stand out in the market and that's why they're turning to mass timber. They want to challenge construction and design norms and create creative, functional spaces that meet the needs of today's changing consumer. Multifamily residents want more than an apartment; they want a warm, comfortable space that fits with their lifestyle, and corporate tenants are looking for innovative spaces that prioritize collaboration.

3. Carbon Reduction

Wood is 50% carbon by dry weight, and wood products sequester carbon for the duration of their lifecycle. Using wood as a primary construction material results in significant carbon savings compared to conventional structural materials like steel or concrete. More consumers are seeking sustainable options, and many governing bodies offer credits or benefits to green buildings and construction practices.

The Keys to Successful Projects

Commit to Timber Early

In any construction project, it is essential to gain alignment on goals and strategies from the beginning. Of those surveyed on tall wood projects, all respondents stressed the importance of committing to a timber solution at the start of the project, because it allows teams to address challenges or changes in design and execution proactively.

Thorough Pre-Planning Makes a Difference

In a perfect world, construction projects would always adhere to a predefined timeline, but in reality, there are always delays. What's written down in plans doesn't always translate perfectly, and adjustments must be made. A significant upfront effort to pre-plan and account for potential issues saves time and money in the long run. Because the standards for tall wood projects are being developed in real time, project teams are most successful when they approach the work with flexibility and collaboration.

Increase Upfront Design Time

Developers and designers are learning the nuances of building with mass timber on the job. While the learning curve is fast, projects will be more successful when designers are given adequate time to access relevant research and solve challenges before the construction phase. Building codes are changing to allow for taller mass timber projects, which can impact the potential designs of new projects. Providing enough time for designers to understand the building codes makes for a smoother construction process down the line.

Engage Authorities Having Jurisdiction Early and Often

Authority Having Jurisdiction (AHJ) is the agency that regulates the local, regional, or national building industry. Across the board, developers, owners, designers, and construction teams found that engaging their AHJ early on in the research and due diligence process resulted in a more collaborative and respectful relationship overall. AHJs will continue to play an important role in the world's evolving mass timber industry.



Chapter 5

Proven Results:

Outstanding Building Performance

With all the time and effort that goes into designing a sustainable mass timber building, developers and owners are focused on delivering outstanding building performance over time. The efficiency of water and energy use and maintaining proper ventilation, humidity control, and air quality are each important aspects of superior building performance.

Efficient Envelope

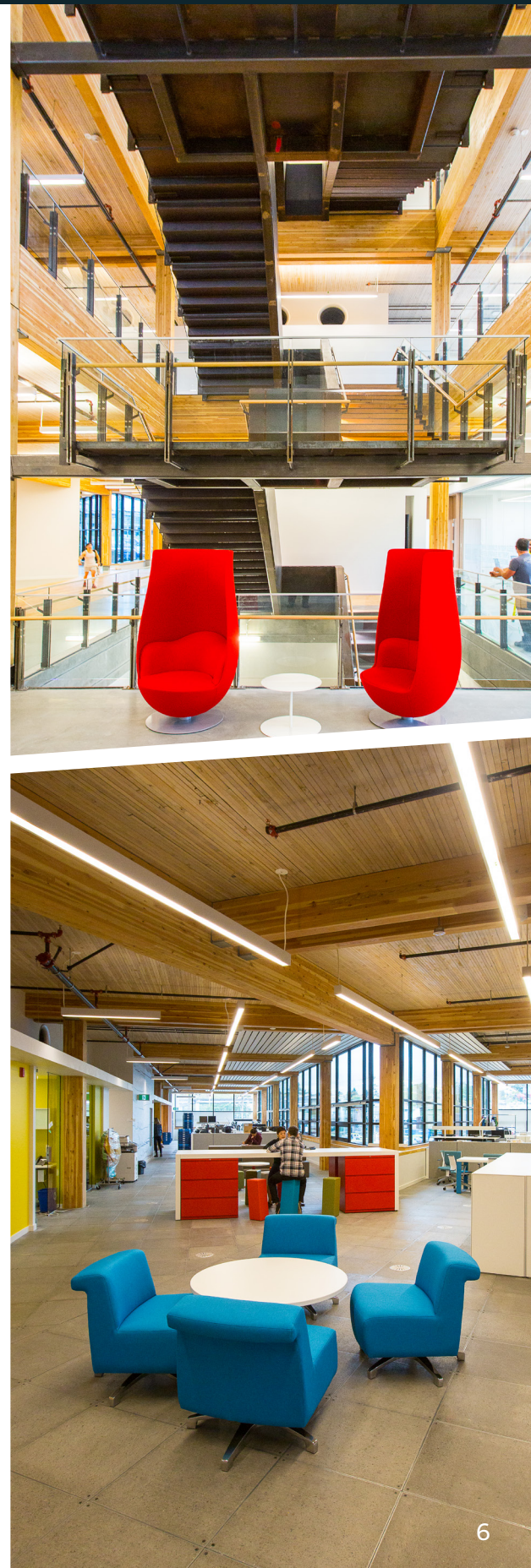
Creating an efficient envelope is a top priority in design, and using precision-cut prefabricated mass timber elements improves the airtightness of a building significantly. Fewer joints and gaps requiring sealing create less opportunity for breaches between conditioned and unconditioned environments. Mass timber is also a poor conductor of heat, so it minimizes thermal bridging and improves insulation effectiveness, leading to the elevated performance standards building owners seek.

Earning Occupant Buy-in

Occupant education is an important element of a robust ongoing maintenance plan, and it is essential to train new owners on the effective operations of the new space. When owners know what to expect in terms of building performance, they're more likely to see and appreciate the innovation that went into building construction.

Thermal Comfort

Anyone who has worked in an office with poorly-regulated ventilation understands the importance of thermal comfort. Mass timber lends to thermally balanced spaces and healthy indoor environments. It aids in humidity control and helps buildings maintain a constant temperature. While mechanical systems are still required, they are aided by passive systems like daylighting, natural ventilation, and the overall efficiency of the building's envelope.



Chapter 6

Additional Opportunities:

Sustainable Living

Those building with mass timber are already making a significant contribution to creating sustainable living environments all around the world. As populations continue to grow and move toward urban centers, the need for additional residential and non-residential spaces will increase accordingly. Mass timber is a great first step toward sustainability, and many new tall wood buildings are going above and beyond to decrease environmental impacts in new and innovative ways.

Here are the top ways innovators are addressing sustainability:

- Wood-waste biomass fuel heating systems
- Photovoltaic arrays
- LED lighting with occupancy sensors
- Heat recovery on ventilation systems
- Green roof systems
- Rainwater/greywater reuse
- Air pollution filtration

